

ABSTRACT OF THE DISCLOSURE

A method for forming an oxidation barrier including at least partially immersing a semiconductor device structure in an electroless plating bath that includes at least one metal salt and at least one reducing agent. The reaction of the at least one metal salt with the at least one reducing agent simultaneously deposits metal and a dopant thereof. The oxidation barrier may be used to form conductive structures of semiconductor device structures, such as a capacitor electrode, or may be formed adjacent conductive or semiconductive structures of semiconductor device structures to prevent oxidation thereof. The oxidation barrier is particularly useful for preventing oxidation during the formation and annealing of a dielectric structure from a high dielectric constant material, such as Ta₂O₅ or BST.

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